



Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

The species of *Lycopodium* of the American tropics

LUCIEN MARCUS UNDERWOOD AND FRANCIS ERNEST LLOYD

In 1900 we published a preliminary list of the West Indian species of *Lycopodium* in connection with a revision of the species of temperate North America.* During the few years that have since elapsed, our knowledge of the tropical species has been greatly extended, chiefly through the explorations that have been made in various parts of the West Indies under the direction of the New York Botanical Garden. The expeditions to Porto Rico by Underwood and by Wilson, to St. Kitts by Britton and Cowell, to Cuba, by Britton, Shafer, and Wilson, and by Underwood and Earle, to Haiti by Nash, to Jamaica by Underwood and by Maxon of the United States National Museum, and to Dominica by Lloyd have all brought back an extensive array of material. This has been amply supplemented by the Jenman collection purchased by the Garden in 1903, which is specially rich in material from Jamaica, Grenada, Martinique, and Guiana. Other recent South American material has been supplied through the rich collections of H. H. Smith in the Santa Marta region of Colombia, and of R. S. Williams in the Andean region of Bolivia. The latter collection particularly has brought to light a number of very interesting species. American collections are still lacking in good representative material from Brazil, and there are occasional species from other regions about which additional light is still greatly desired. In order to place our present knowledge in an accessible form, we present this second preliminary report on the species of the West Indies and Mexico, and have included occasional species from South America. The West Indian forms are now fairly well limited and localized, yet it is not impossible or even unlikely that still other species will be found in the archipelago when the higher altitudes of the larger islands shall have been explored. The Mexican and especially the Central American species are much more obscure, and must await further exploration. The same is

* LLOYD, F. E. & UNDERWOOD, L. M. A review of the species of *Lycopodium* of North America. Bull. Torrey Club 27 : 147-168. 1900.

even more true of South America, which is likely to yield species yet unknown, as well as much more definite information about many that are now only imperfectly known.

All descriptions of structural characters are based upon material prepared by boiling, and upon glycerin-jelly microscopic preparations, of which in all instances camera-lucida drawings were made to a uniformly applied scale.

The three sections of the genus *Lycopodium* that are represented in the American tropics may be distinguished as follows:

Foliage leaves normally many-ranked, mostly uniform.

Sporangia in the axils of unaltered leaves.

§ 1. *Selago*.

Sporangia aggregated in distinct terminal strobiles whose bracts differ widely from the foliage leaves.

§ 2. *Lepidotis*.

Foliage leaves 4-5-ranked, dimorphous; stems strongly dorsiventral.

§ 3. *Diphasium*.

§ 1. SELAGO

The northern types of this group are familiar in the boreal *Lycopodium Selago* and the more common *L. lucidulum* of the Northern States. *L. porophilum* is a more restricted and local plant somewhat intermediate between the other two species. The tropical representatives are more numerous, a very few simulating the northern species in habit, while a much greater number become epiphytic and are pendent from trees. The species* of meridional America may be separated as follows:

Plants with radial symmetry; leaves not twisted.

Plants terrestrial in habit.

Leaves short, 1 cm. or less long.

Plants erect or ascending; leaves rigid.

Leaves in 16-20 ranks; stems short and rather stout.

Leaves serrulate, strongly hooked at the ends.

5. *L. densifolium*.

Leaves straight, with entire margins.

4. *L. Sieberianum*.

Leaves in 8 ranks, serrulate; stems elongate.

Leaves reflexed or loosely spreading.

Leaves verticillate, distant, closely coiling when dry.

3. *L. polycarpum*.

Leaves scattered, crowded, reflexed-spreading; sporangia

1.2 mm. wide.

1. *L. reflexum*.

* A number of the species from South America are omitted here, owing largely to lack of sufficient material. The following members of this group are more or less perfectly represented in the herbarium of the New York Botanical Garden in addition to the species tabulated below: *L. compactum* Hook., *L. rufescens* Hook., *L. erythraeum* Spring, *L. tetragonum* Hook., *L. crassum* H. B. K., *L. Hartwegianum* Spring, *L. filiforme* Sw.

- Leaves rigid, thick, ascending ; sporangia 1.8 mm. wide.
 2. *L. rigidum*.
 Plants spreading or pendent ; leaves lax, somewhat secund.
 9. *L. portoricense*.
 Leaves longer, 1.5 cm.
 Leaves linear, 0.6–0.8 mm. wide. 6. *L. montanum*.
 Leaves lanceolate, 1 mm. wide. 7. *L. hippurideum*.
 Plants epiphytic, pendent from trees.
 Leaves short, 8 mm. or less long.
 Plants with slender, many times dichotomous stems.
 Plants 60 cm. or more long.
 Strobiles compact ; sporophylls short, triangular.
 10. *L. Pringlei*.
 Strobiles lax ; sporophylls slender, subulate.
 8. *L. setaceum*.
 Plants short, under 20 cm. long ; leaves very narrow, scattered,
 widely spreading. 20. *L. Williamsii*.
 Plants with thick cord-like stems, closely dichotomous.
 Leaves slender, flaccid. 17. *L. funiforme*.
 Leaves broader at base, rigid. 16. *L. Picardae*.
 Leaves larger, 1–3 cm. long.
 Stems red, robust ; leaves 2.5 cm. long, sharply reflexed from near the
 base. 12. *L. pithyoides*.
 Stems green.
 Leaves and sporophylls 4-ranked. 15. *L. nitens*.
 Leaves and sporophylls 6–10-ranked.
 Leaves rigid, closely appressed. 14. *L. cuernavacense*.
 Leaves lax, spreading.
 Leaves narrow, less than 0.5 mm. wide.
 19. *L. Wilsonii*.
 Leaves wider, 0.5–1 mm. wide ; midrib prominent.
 18. *L. dichotomum*.
 Plants more or less dorsiventral by the twisting of the leaves.
 Leaves sharply twisted at the base, usually narrowed below.
 Plants short, 25 cm. or less long.
 Stems short, dichotomous from near the base ; leaves crowded, short and
 rigid ; midribs prominent.
 13. *L. Orizabae*.
 Stems lax ; leaves scattered, widely spreading, broadest at the middle,
 less than 1 cm. long ; sporophylls similar. 23. *L. tenuicaule*.
 Plants elongate, 35–80 cm. long ; leaves lax, with less conspicuous midribs,
 long-tapering.
 Leaves straight or slightly arcuate, 1.5–3 mm. wide, with inconspicuous
 midribs. 21. *L. linifolium*.
 Leaves strongly arcuate, widely spreading, narrow (1 mm.), with con-
 spicuous midribs ; sporophylls short (8 mm.), slender.
 22. *L. Jenmani*.
 Leaves twisted throughout their entire length, widest at base.
 11. *L. taxifolium*.

1. LYCOPodium REFLEXUM Lam. Encyc. Meth. Bot. 3: 653. 1789.
(Type from Martinique, *Martin*.)
Lycopodium squarrosum Sw. Nov. Gen. et Sp. Pl. 137. 1788.—Fl.
Ind. Occ. 3: 1571. 1806. (Type from Jamaica, and cites
same plates as Lamarck.) Not *L. squarrosum* Forst. 1786.
Lycopodium reflexum Willd. Sp. Pl. 5: 52. 1810. (Type from
"Amer. merid."; apparently described independently by
Willdenow, overlooking Lamarck's name.)
Lycopodium bifidum H. & B.; Willd. Sp. Pl. 5: 53. 1810. (Type
from "Amer. merid.")
Lycopodium eversum Poir. Encyc. Meth. Bot. Suppl. 3: 556.
1813. (Based on *L. reflexum* Willd. not Lam.)
Lycopodium reversum Presl, Rel. Hænk. 1: 82. 1825. (Type
from Guayaquil.)

In the above long synonymy we have a hint of wide distribution and a considerable degree of variability, which was aggravated by the citation in Lamarck's original description of two plates that did not belong to the species, which he described as having reflexed leaves, viz.: Plumier, Fil. *pl. 166, f. A*, and Dillen, Hist. Musc. *pl. 57, f. 4*, which were later separated as a distinct species.

RANGE: Cuba (*Wright 933*), Porto Rico, Jamaica, Haiti (*Nash 557*), Guadeloupe (*Perrin*), Mexico, Guatemala (*J. D. Smith 504*, *Maxon 3560*), Colombia, Bolivia.

2. LYCOPodium RIGIDUM Gmelin, Syst. Nat. ed. 13. 2: 1289.
1791. (Founded on Dillen, Hist. Musc. *pl. 57, f. 4*.)

This figure of Dillen represents the rigid form of the plant, which has often passed as *L. reflexum*. Dillen's figure according to his own statement is copied from Plumier (Fil. *pl. 166, f. A*), so that by some *L. rigidum* might be regarded as a synonym of *L. reflexum* Lam.*

* In the whole matter of the determination of types a certain amount of plain ordinary common sense must be used. In this instance we have in the West Indies two closely allied plants whose imperfect original descriptions both cite the same plates. One plant has notably *reflexed* leaves while the other has *rigid* leaves. It was evidently this character in each case that suggested the names *reflexum* and *rigidum*. Lamarck clearly had the plant whose leaves are lax and consequently become reflexed as they mature. His plant, collected in Martinique by Martin, if in existence will serve as a type of his species. But he added to his description, citations from Plumier and Dillen drawn evidently from the species with rigid erect leaves, which Gmelin later

RANGE: Jamaica (*Wilson, Jenman, Underwood 181*), [Martinique?, *Plumier*]. This plant is apparently less common and less widely distributed than *L. reflexum*.

3. ***Lycopodium polycarpum*** (Sod.) sp. nov.

Lycopodium reflexum γ *polycarpum* Sod. Crypt. Vasc. Quitenses 569. 1893. (Type from Ecuador.)

A terrestrial plant with verticillate distant leaves 35–40 cm. high. Stem rather slender, 1.5 mm. or less thick, four times dichotomous, the ultimate divisions elongate; leaves and sporophylls distant, in nearly regular whorls, about 8-ranked, 4–5 mm. long by 0.8 mm. wide, linear-lanceolate, acute, serrulate, recurved, in drying bent back to form a semicircle; sporangia reniform, 1.5 mm. wide, laterally exceeding the sporophylls in width.

ECUADOR: 1899, *Sodiolo* (type); *Spruce 4973*.

We have excellent specimens from Father Sodiolo which show a relation to *L. reflexum* but are amply distinct as a species. The large sporangia coupled with the distant leaves make the former unusually prominent, a fact that is recorded in the name. The species is apparently most closely related to *L. intermedium* Spring, of which we have not seen the type, but in any case that name is antedated by *L. intermedium* Blume, by a number of years.

4. **LYCOPODIUM SIEBERIANUM** Spring, Monog. Lycop. 1: 23, *excl. syn.* 1842. (Type from Martinique, *Sieber 56*.)

Spring apparently confused with specimens of a very distinct species, various figures, some of which had already served as types of other species. On receiving a very distinct plant from St. Kitts we had thought at first to describe it as new on the strength of these citations, but on examination of *Sieber 56* at Berlin the past summer (the plant on which Spring based his name and in part his description) we find that our St. Kitts plant

separated as *L. rigidum*, basing his description on Dillen's plate which was taken direct from Plumier. In the absence of type specimens there are many who would make the two names synonyms, and rename Gmelin's species. But to one familiar with both plants in the field the names *reflexum* and *rigidum* assume greater importance and significance. The liability of error in interpretation in the purely "literary revision" of plant names without the supplemental knowledge of the plants themselves, receives here a capital illustration, and all such revision is to be deprecated. Plain common sense would suggest the continuance of the two names accepted above as representing the spirit of the founders of the two species concerned.

agrees perfectly, so that it is necessary to retain Spring's name with an emended application. We have therefore drawn up a fresh description from a recently collected plant :

A stout terrestrial plant with 2-3 forks, and leaves crowded in about 20 ranks. Stems 20 cm. or more long ; leaves 5 mm. long or more by 0.8 mm. wide at the base, entire, tapering to an acute apex, spreading, slightly ascending, curved dorsiventrally at the base and near the apex ; sporangia reniform, exceeding the sporophyl in width by only a small amount.

MARTINIQUE: *Sieber 56* (specimens in herb. Berol.); *Hahn 1263* (specimens in herb. Kew).

ST. KITTS: Mt. Misery, among ferns, *Britton & Cowell 547*. Only a single plant was collected, but its characters are so strikingly different from *L. reflexum* and *L. rigidum*, its nearest allies, that we do not hesitate to take up Spring's name for it as representing a valid species. This plant is no doubt included by Baker in his description of *L. rigidum*, and Hahn's plant above cited was found under the cover of *L. rigidum* at Kew. We have not seen the plants from Peru and Chile, cited by Spring, so can give no details of its distribution further than recorded above. The habitat of the plant seems to be the volcanic craters of the Lesser Antilles. The exact locality of Sieber's plant is not recorded. Hahn's plant came from Mont Pelée and the St. Kitts specimen was found in the similar crater of Mt. Misery. It probably will be found on all the volcanic mountains of this group.

5. ***Lycopodium densifolium* (Baker) sp. nov.**

Lycopodium reflexum var. *densifolium* Baker, Handbook of Fern Allies 11. 1887.

A terrestrial plant 35 cm. or less tall, 2-4-dichotomous. Stems stout, 4-6 mm. or more in diameter exclusive of the leaves ; leaves in about 20 ranks, crowded, 4-5 mm. long by 1 mm. wide at base, tapering from a point one fourth the length from the base to the acute mucronate apex which appears obtuse from above or below owing to the excessive curvature, stiff, spreading at right angles to the stem, strongly curved upward (or nearly hooked) at the apex, thickened dorsiventrally throughout the curve ; margins with a few (1-5) short triangular multicellular straight or reflexed teeth near the base, and a few others more widely scattered throughout the length ; sporangia broad, mostly confined to the upper portions of the stems.

ECUADOR: 1857-9, *Spruce* 5429. A unique species, with rigid leaves wholly unlike *L. reflexum*, under which name it was distributed. In the Kew Herbarium Mr. Baker has marked this number of Spruce as *L. reflexum* var. *densifolium*, a conclusion no one could have reached from Mr. Baker's brief description of the plant.

6. ***Lycopodium montanum*** sp. nov.

A terrestrial shade plant, 30-40 cm. high, with decumbent bases and dark-green foliage. Stems 2-3 mm. thick, once or twice forked, the older portions becoming decumbent and ultimately dying away while the newer parts are nearly erect, the whole stems often 70-90 cm. long with dark-green foliage; leaves 1.5 cm. long by 0.7-0.8 mm. wide, linear, acuminate, spreading, at length reflexed, downwardly curved near the tips, the midrib not evident in the dry material but distinct when moist; sporophylls like the leaves, the sporangia much exceeding the sporophylls in width, 1.5 mm. broad and nearly as deep.

JAMAICA: Summit of Blue Mountain Peak in deep shade, *Underwood* 2537 (type), 2542; *Nock* (in herb. Jenman).

Near to this species are the closely allied specimens from Bolivia (*Mandon* 1528) and Ecuador (*Sodi*), which probably belong to *L. Lechleri* Hieron., a species recently described. *L. hippurideum* Christ is also a closely allied species.

This plant was apparently first collected in Jamaica by Nock in 1880 on the ridge of Blue Mountain Peak. Mr. Jenman confused this elegant terrestrial species with the epiphytic and remotely related *L. dichotomum*, and when the latter species was brought in from Grenada he was inclined to regard it as undescribed, as he had evidently not seen the true *L. dichotomum* from Jamaica, where it appears to be rather rare. The two species have very little in common and this elegant plant is one of the handsomest of the terrestrial species, growing in large patches in the shade of the dense forest that covers the summits of the Blue Mountain range.

7. **LYCOPODIUM HIPPURIDEUM** Christ, Prim. Fl. Cost. 3¹: 56. 1901. (Type from Costa Rica, *Pittier* 10619.)

COSTA RICA: El Páramo, 3000 m., Massif de Buena Vista, *Pittier* 10619. Known only from its type locality. There is a cotype in the United States National Herbarium.

8. *LYCOPodium SETACEUM* Lam. Encyc. Meth. Bot. **3**: 653. 1789. (Type from the Antilles and Bourbon; but Plumier, Fil. *pl.* 166, *f.* B, as well as Dillen, Hist. Musc. *pl.* 56, *f.* 3, is cited.) Not *L. setaceum* Hamilton, 1825.

Lycopodium acerosum Sw. (Fl. Ind. Occ. **3**: 1575. 1806; type from Bourbon) may be the same species, since Swartz cites the same plates as Lamarck and states that Dillen also had it from the West Indies. Swartz in Syn. Fil. (1806) refers both *L. setaceum* and *L. acerosum* to *L. verticillatum* L. fil. (Suppl. 448. 1781; type from Bourbon), but this is described as having "*foliis quadri-fariis*," which will not apply to the plant of the American tropics. Since the time of Swartz, the American plant has been referred to *L. verticillatum*, probably incorrectly; at least the name *L. setaceum* is the earliest that it is safe to take up in the absence of any material from Bourbon.*

RANGE: Cuba (*Wright 935, Eggers 5173*), Jamaica (*Jenman*), Martinique (*Père Duss*), Haiti (*Nash 664*), Dominica (*Lloyd 342, 697, 808, 810*).

9. *Lycopodium portoricense* sp. nov.

A bushy but slender pale-green terrestrial pendent plant with subsecund leaves. Stems less than 1.5 mm. in diameter, covered to the bases with leaves, several times dichotomous, 30 cm. or more long; leaves and sporophylls alternating in zones, the leaves linear, acuminate, 6–8 mm. long by 0.3–0.4 mm. wide, more or less secund; sporophylls tapering gradually from a base 0.6 mm. wide to the apex, 6 mm. long; sporangia round-reniform, 1.3 mm. wide by 1 mm. deep.

PORTO RICO: Road from Guyama to Cayey, pendent on banks, *Underwood & Griggs 434* (type); Luquillo Mts., *Percy Wilson 141*.

This species is related rather closely to *L. setaceum*, but differs in its longer leaves, which are truly linear and not tapering from the base, in its larger stems, and in its terrestrial habit.

* Since the time of Swartz it has been quite common to refer West Indian and Central American pteridophytes to species originally described from Bourbon (Réunion) or Mauritius. When we come to examine typical material from those islands we invariably find it very different from the better known American forms referred to the same species. There is every *a priori* reason for supposing the two floras to be very distinct, and every new examination of pteridophyte types shows this supposition to be true.

10. *Lycopodium Pringlei* sp. nov.

Epiphytic, pendulous, of slender open habit; stems 40 cm. or more long, about five times dichotomous, appearing cord-like from the appressed leaves; leaves subulate, 2.5–3 mm. long, 0.6 mm. wide, about 6-ranked; strobiles more or less interrupted, the shoots becoming variable in thickness because of the large crowded sporangia; sporophylls triangular, entire, 1.3 mm. long or less, 0.8 mm. wide at base, exceeding the sporangia only by their short apices, appressed except when distended by the ripened sporangia; sporangia nearly circular, 0.8 mm. wide by 0.6 mm. deep, sometimes slightly protruding beyond the margins of the sporophylls.

MEXICO: Hanging from oaks, Sierra de Clavellinas, 9000 ft., Oaxaca, *Pringle 4994* (type); Orizaba, *Müller 361*. A plant collected at Morelos, *Rose 4416*, is either this or very closely allied.

The plant was distributed by Pringle as *L. verticillatum*, but does not show close relationship to any of the West Indian plants bearing that name or that have been referred to that species. It is a much smaller-stemmed plant than *L. nitens*, and has 6-ranked instead of 4-ranked leaves and sporophylls as in that species.

11. LYCOPODIUM TAXIFOLIUM Sw. Nov. Gen. et Sp. Pl. 138. 1788.—Flor. Ind. Occ. 3: 1573. 1806. (Type from Jamaica; in the latter work Swartz also says "*etiam in insula St. Helena.*")

While there is very great variation in the length of the leaves, often resulting in the appearance of much more slender stems, we cannot distinguish among the specimens from the West Indies the *Lycopodium passerinoides* H.B.K. (Nov. Gen. 1: 41. 1815), the type of which was from Peru, and quite likely represents a plant widely different from the West Indian things that in recent years have been referred to it.

RANGE: Cuba, Hispaniola, Porto Rico, Jamaica, Dominica, St. Vincent, Grenada, Mexico, Colombia.

12. LYCOPODIUM PITHYOIDES Schlecht. & Chamisso, Linnaea 5: 623. 1830. (Type from Jalapa, Mexico, *Schiede & Deppe*.)

MEXICO: Santa Maria, *Schaffner*; Orizaba, *Müller 691*.

GUATEMALA: *Seler 2329*.

CUBA: Santiago, *Hamilton 247*.

This characteristic species, long neglected or overlooked at Kew, is so clearly defined that one wonders at the oversight.

The plant from Cuba, though a fragment, is unmistakable, and shows an unexpected and unusual distribution.

13. ***Lycopodium Orizabae*** sp. nov.

A short rather stout epiphyte 16 cm. or more tall, with abundant lanceolate leaves. Stems 2–3 mm. thick at the base, more slender above, 3–4 times dichotomous, rising from dense clusters of roots; leaves 1.5–1.8 cm. long by 2–2.3 mm. wide, lanceolate-acuminate, broadest near the base, thence abruptly narrowed at the base, asymmetric, the midrib slender but evident almost to the apex, the margins entire; sporophylls similar to the leaves, but shorter and narrower, 1 cm. long by 1 mm. wide, lanceolate, broadest near the middle, acuminate, twisted at the base, slightly asymmetric; sporangia reniform, 1.8 mm. wide by 1.5 mm. deep.

MEXICO: Orizaba, *Müller 690*. Known only from its type collection.

14. ***Lycopodium cuernavacense*** sp. nov.

An elongate rigid epiphyte, with stiff appressed leaves. Stems attaining 60 cm. or more long, 3–4-forked, the branches diverging at a very small angle, rather stout, 3–4 mm. thick; leaves crowded, somewhat appressed, rigid, 2 cm. long by 2 mm. wide, subulate-acuminate, broadest at the base, the midrib evident by a furrow when dry, the margins entire; sporophylls similar to the leaves but shorter, about 1 cm. long; sporangia circular, slightly exceeding the sporophylls in width.

MEXICO: Morelos; trees in mountains above Cuernavaca, 8,500 ft., *Pringle 7613*.

This species is related to *L. taxifolium*, for which it was distributed, but differs from that species both in habit and in structural characters.

15. **LYCOPODIUM NITENS** Schlecht. & Chamisso, *Linnaea* 5: 623. 1830. (Type from Jalapa, Mexico, *Schiede & Deppe*.)

Of this species we have seen only an original specimen, a sheet of which is at Kew. Its four-ranked leaves and sporophylls render it a striking plant.

16. **LYCOPODIUM PICARDAE** Christ, *Bot. Jahrb.* 24: 148. 1898. (Type from Haiti, *Picarda 978*.)

We have a portion of the original collection made in 1892 (*Picarda 978*) whose label reads "Haiti prope Keurcoff in caverna, alt. 1,200 m."

17. *LYCOPODIUM FUNIFORME* Chamisso ; Spring, Monog. Lycop. **1** : 50. 1842.

The name was given by Chamisso to a plant in herb. Bory which was marked "California"; to this Spring in publishing the description added "Guadeloupe, *L'Herminier*" which should be regarded as the type locality. The plant is a well known Antillean species and the "California?" was evidently a mistake as the plant is apparently endemic in the West Indies.

RANGE : Cuba (*Wright 943*, *Pollard & Palmer 168*, *Underwood & Earle 658*, *1033*), Porto Rico (*Heller 1084*, *Percy Wilson 102*), Guiana (*Jenman*).

The living plant is well named, as the resemblance to cordage is very striking.

18. *LYCOPODIUM DICHOTOMUM* Jacq. Hort. Bot. Vind. **3** : 26. *pl.* 45. 1776. (Type from Martinique.)

RANGE : Cuba (*Wright 944*), Hispaniola (*Nash 680*), Jamaica (*Clute 64*), Dominica (*Lloyd 506*, *798*, *809*, *819*), St. Kitts (*Britton & Cowell 304*), Grenada (*Sherring*), Guadeloupe (*Dr. Madi-ana*), Martinique, St. Vincent (*Smith 735*), Mexico (*Schaffner 3*, *Pringle 3976*), Guiana (*Jenman*).

There is some degree of variation present in this species. We were at first inclined to separate the St. Kitts plant as distinct and with it would go the scrap from Guadeloupe here cited from the Torrey herbarium. As noted above, Mr. Jenman confused the plant which we have described as *L. montanum* with this species, and then in his herbarium referred the Grenada plants really belonging here to a new name, *L. grenadense* Jenm. It is probably more logical to consider all the forms as coming under a single species.

19. *Lycopodium Wilsonii* sp. nov.

A small epiphyte with divergent forking branches and slender leaves. Stems 8–15 cm. long, about 2 mm. thick, with about three forks, the branches divergent; leaves linear, 1.5–1.8 cm. long by 0.6 mm. wide, very gradually tapering from the base to the acuminate apex, symmetrically or slightly curved; sporophylls similar to the leaves, but smaller, 1 cm. long by 0.4 mm. wide; sporangia round-reniform, 1.5 mm. wide by 1.3 mm. deep, exceeding the sporophylls in width.

PORTO RICO : Luquillo Mountains, *Percy Wilson 271* (type), 153.

This species is perhaps nearest to *L. dichotomum*, varying in the direction of *L. setaceum*, but widely different from either in habit and structure. We dedicate it to its enthusiastic collector, whose visit to Porto Rico was productive of several novelties in the genus *Lycopodium*.

20. ***Lycopodium Williamsii*** sp. nov.

A small slender much-branched epiphyte 10–15 cm. long. Stems slender, pendulous, less than 1 mm. thick, sparsely covered with foliage below, hidden by the copious sporangia above; leaves scattered, slightly curved, widely spreading or descending, 7–9 mm. long by 0.5 mm. wide, linear, acute, with entire margins; sporophylls shorter, 4–6 mm. long by 0.3 mm. wide, linear; sporangia round-reniform, prominent, relatively large, 1 mm. wide by 0.8 mm. deep.

BOLIVIA : New Brazil, 5,500 ft., *Williams 1393*.

This beautiful moss-like species was collected by Mr. R. S. Williams on the Conway expedition in 1902, and we are pleased to recognize his discriminating field-work which shows itself in most beautifully prepared specimens, a form of work only possible when a trained botanist is sent to the field, and is not hampered by the necessity of collecting "sets of plants" for commercial or exchange purposes.

21. *LYCOPODIUM LINIFOLIUM* L. Sp. Pl. 1100. 1753. (Type from "Amer. merid." based on Dillen, Hist. Musc. *pl. 57, f. 5*, and Plumier, Fil. *pl. 166, f. C.*)

RANGE : Cuba, Hispaniola (*Nash 195* *), Porto Rico, Jamaica, Grenada, Trinidad, Mexico, Guatemala, Colombia, Venezuela, Guiana, Bolivia.

22. ***Lycopodium Jenmani*** sp. nov.

A slender pendent much-branched epiphyte with attenuate branches. Stems very slender, 1 mm. thick, much branched, with

* These specimens collected by Mr. Nash are simply superb developments of this beautiful species, the multitudinous branches of a bushy plant rising from a single stem all represented on the sheet, and strikingly in contrast with the old-fashioned "tips" of branches that constitute too many of the herbarium specimens of a past generation. Such specimens as these really give one some idea of the habit and true character of the living plant.

scattered leaves and contracted sporophylls ; leaves arcuate, lanceolate, acuminate, 1–1.3 cm. long by 1–1.2 mm. wide, unsymmetrical, the midrib nearer one margin, widely spreading, distinctly curved, twisted at the base so that the blade lies in the plane of the axis ; sporophylls twisted like the leaves, linear, much smaller at the ends of the branches, but ultimately attaining the size of the smaller leaves ; sporangia reniform, 1.5 mm. wide by 1 mm. deep, much exceeding the leaves in width and thus appearing very conspicuous in the mass of foliage.

BRITISH GUIANA : Moruca River, *Jenman*.

Mr. Jenman had marked this plant in his herbarium as a distinct variety of *L. linifolium*, but the name assigned being untenable as a specific name in the genus, we are pleased to dedicate it to the memory of this most assiduous of students of the pteridophytes of the British colonies in America, whose collection and critical notes and publications add so much to our exact knowledge of the tropical pteridophyte flora of America.

23. *Lycopodium tenuicaule* sp. nov.

A lax slender epiphyte with delicate scattered leaves. Stems springing from a small cluster of roots, 20–30 cm. long, loosely branched, smooth, 1 mm. thick, the shoots dorsiventral by the twisting of the leaves at their bases ; leaves 7–9 mm. long by 1.5 mm. wide, lanceolate, broadest at the middle or just above, acute, slightly unsymmetric, entire, twisted at the base so as to bring the blade to the plane of the axis, widely spreading, scattered, all sporangiate except on the oldest part of the stem ; midrib slender, scarcely evident beyond the middle of the leaf : sporangia reniform, 1.3 mm. wide by 1 mm. deep.

DOMINICA : Mt. Diablotin, *Lloyd 878* (type).

PORTO RICO : Luquillo Mountains, *Percy Wilson 139*.

This delicate and graceful species which has appeared from two rather distant and distinct stations is very unlike any other West Indian species, forming a peculiar type with no near congeners.

§ 2. LEPIDOTIS

The tropical American species of this section fall somewhat naturally into four groups which are widely separated from each other in habit. We may separate these groups synoptically as follows :

- Species epiphytic, pendent from trees ; leaves dorsiventral. **Phlegmaria Group.**
 Species of terrestrial habit.
 Stems erect, usually naked at the base ; habit tree-like. **Cernuum Group.**
 Stems creeping.
 Stems wide, trailing, with ascending branches. **Clavatum Group.**
 Stems short, prostrate, with simple monostachyous branches. **Iuliforme Group.**

PHLEGMARIA GROUP

This group with strongly dorsiventral leaves is largely represented in South America, but one of the species extends into the West Indies. They may be separated as follows :

Leaves broadly oval or obovate.

 Leaves small, 3.5 by 2.5 mm. ; sporophyls scarcely exceeding the sporangia.

 Leaves narrowed (cuneate) at the base.

24. *L. cuneifolium*.

 Leaves rounded at the base.

25. *L. callitricaeifolium*

 Leaves larger, 6-8 by 3-5 mm. ; sporophyls extending into a point beyond the sporangia.

 Sporophyls long, often attaining 20-40 cm. ; leaves mostly regular.

26. *L. aqualupianum*.

 Sporophyls short, 1-2 cm. ; leaves obtuse or nearly so, irregularly spreading.

27. *L. dichaeoides*.

Leaves lanceolate or lanceolate-ovate.

 Leaves 2 mm. or more wide ; sporophyls extending beyond the sporangia into a long point.

29. *L. roraimense*.

 Leaves under 2 mm. wide ; sporophyls shorter than the sporangia.

28. *L. subulatum*.

24. LYCOPODIUM CUNEIFOLIUM Hieron. Bot. Jahrb. 34 : 572. 1905. (Type from Costa Rica, *Hoffmann* 50.)

COSTA RICA : Vulcan de Barba, *Hoffmann* 50 ; with no locality, 1900, *C. Wercklé*. A plant nearly allied to *L. callitricaeifolium* but readily separated by its more distant narrowly obovate leaves.

25. LYCOPODIUM CALLITRICAEOFOLIUM Mett. Ann. Sci. Nat. V. 3 : 309. 1865. (Type from Bogota, Colombia, *Triana*.)

RANGE : Ecuador (*Spruce* 4792, *Sodiolo*), Colombia, Costa Rica (*Warszewicz* 12.)

26. LYCOPODIUM AQUALUPIANUM * Spring, Monog. Lycop. 1 : 68. 1842. (Type from Guadeloupe, *L'Herminier*, and Hispaniola, *Neckour*.)

* This name is probably a misprint for *guadalupianum* to which form Fée changed it in 1866 ; Urban (1903) writes it "*guadeloupeanum*." We retain the original orthography as safer.

RANGE: Cuba (*Wright 936, Eggers 5165*), Porto Rico (*Sintenis 1546, Percy Wilson 155*), [Hispaniola, Guadeloupe], Bolivia (*Rusby 458*). The last named plant is sterile but cannot be separated by its foliage; it is distinct from *Mandon 1529*, which is *L. subulatum*.

27. LYCOPODIUM DICHAEOIDES Maxon, Proc. Biol. Soc. Washington **18**: 231. 1905. (Type from Guatemala, *Cook & Griggs 251*.)

GUATEMALA: Alta Verapaz, near Sepacuité, *Cook & Griggs 251*; between Sepacuité and Secanquim, *Maxon & Hay 3268*. Known only from these two collections now in the United States National Herbarium.

28. LYCOPODIUM SUBULATUM Desv. Encyc. Bot. Suppl. **3**: 544. 1813. (Type from "Amer. merid.")

Represented in typical form in the herbarium of the New York Botanical Garden only by sheets of *Mandon 1529* from Bolivia. There are numerous variations, some of which have been described by Baker. Among these are two sheets from Ecuador collected by Sodiro, which are marked "var. *pastoense*," which differ from each other and must be compared with Baker's type before they can be definitely placed. They probably represent one or more distinct species.

29. *Lycopodium roraimense* sp. nov.

A long slender pendulous epiphyte with sporophylls much longer than the sporangia. Stems over 75 cm. long, 2-3 forked, dorsiventral (except in the sporophyllary region) by the twisting of the leaves, the strobile elongate (30 cm.) and radially symmetrical; leaves lanceolate-ovate, acute, 8-9 mm. long by 2.5 mm. wide, twisted at the base, entire, thin, the midrib slender but distinct; sporophylls triangular, small, 1.5-3.5 mm. long by 1-1.5 mm. wide, extending beyond the sporangia in a point, the margins entire; sporangia conspicuous, nearly circular, exceeding the sporophylls in width.

BRITISH GUIANA: Forest slopes near Roraima (*herb. Jenman*). This plant differs from *L. subulatum*, its nearest ally, in its wider leaves and much longer sporophylls.

CERNUUM GROUP

The species of this group have a close relationship among themselves and are quite isolated from other related species.

Baker,* with characteristic disregard of continental work, reduces all the species involved, to *L. cernuum*, with three varieties, in which citation and synonymy are sadly at variance with accuracy and correctness, and all ideas of geographic distribution are left to reckless abandon.

In 1861 Müller,† with characteristic German positiveness, set aside a Javan plant as the genuine type of *Lycopodium cernuum* L., characterized by having (1) "*Folia caulina squarrosa*" in common with most other species recognized, and (2) "*Amentis centripetali-evolutis*," a character claimed as peculiar to this species, but one difficult to follow in actual material. Further than this he established five new species all from the Old World, besides recognizing *L. marianum* Willd. from the Philippine Islands. The distribution of his five new species was as follows :

Lycopodium Heeschi K. Müll. (*loc. cit.* 164) — Sierra Leone.

Lycopodium secundum K. Müll. (*loc. cit.* 164) — Cape Colony, Natal.

Lycopodium sikkimense K. Müll. (*loc. cit.* 164) — Sikkim (India).

Lycopodium Moritzii K. Müll. (*loc. cit.* 165) — Java.

Lycopodium Hupeanum K. Müll. (*loc. cit.* 165) — Borneo.

In Müller's paper the species of tropical America were not considered, and two earlier descriptions from the Old World were apparently disregarded, *viz* :

Lycopodium vulcanicum Blume, Enum. Pl. Jav. 2: 266. 1828.
(Type from Java.)

Lepidotis convoluta Beauv. Prodr. L'Aetheog. 108. 1805.
(Type from "Les deux Indes.") Material in American collections is insufficient to determine the status of Müller's species, but a partial examination of European herbaria convinces us that some of them at least are valid.

Hieronymus has recently ‡ taken up the name *Lycopodium capillaceum* Willd. for the common American species, citing Spring's reference to Willdenow's herbarium note § and stating that Willdenow's plant was from "Nova Andalusia" (Venezuela) instead of "Ins. Marianis" as stated by Spring. After seeing

* Handbook of Fern Allies 23. 1887.

† MÜLLER, KARL. Zur Kenntniss des *Lycopodium cernuum* L. Bot. Zeitung 19: 161-165. 1861.

‡ Plantae Lehmannianae etc. Bot. Jahrb. 34: 573. 1905.

§ Flora 21: 165. 1838.

Ceylon material (for we must regard the Ceylon plant as the type of *Lycopodium cernuum*) in various European collections, commencing with that of Linnaeus at London, we are unable yet to point out differences other than minor ones between the plants of Ceylon and those of the West Indies. We are compelled against our tendencies to retain the name *cernuum* for the common species of the American tropics. Hieronymus has also separated two additional South American species, neither of which affect those which had been already separated by us.

The four species from America which we have examined may be separated as follows:

- Leaves toothed; axes bristly; strobiles elongate (1.5-4 cm.). 31. *L. curvatum*.
- Leaves entire; axes mainly smooth.
- Strobiles short (1 cm. or less), with deeply ciliate-laciniate sporophylls; branches slender. 30. *L. cernuum*.
- Strobiles longer (1.5-2 cm. or more); sporophylls slightly toothed; branches stout.
- Sterile branchlets elongate (5-10 cm.) and pendulous; leaves short and abruptly narrowed. 33. *L. pendulinum*.
- Sterile branchlets short, stout, dichotomously spreading; leaves longer, gradually tapering. 32. *L. tortum*.

30. LYCOPODIUM CERNUUM L. Sp. Pl. 1103. 1753. (Type from "Indiis"; the bulk of the citations commencing with Linnaeus' own Fl. Zeyl. and Dillen indicate that the East India plant is the one which represents the plant as known to Linnaeus and his predecessors. Plumier, Fil. *pl.* 165 *A* is cited later as an example of an American plant.*)

RANGE: (In America only) Georgia, Florida, Alabama, Mississippi, Cuba, Hispaniola, Porto Rico, Jamaica, S. Thomas, St. Kitts, Guadeloupe, St. Vincent, Dominica, Trinidad, Mexico, Panama, Colombia, Guiana.

31. LYCOPODIUM CURVATUM Sw. Syn. Fil. 178, 402. 1806. (Type from Jamaica.†)

* As noted above this plant is the one to be renamed in case the American plant is ever distinguished from that of Ceylon.

† In publishing this species Swartz cites in synonymy (*loc. cit.* 178) *Lycopodium arboreum* Gmel. (a name apparently unpublished) and *Lepidotis convoluta* Beauv., a plant imperfectly described in Prodr. L'Aetheog. 108 (1805) from "Les deux Indes." Later (*loc. cit.* 402) Swartz in giving a fuller description cites Jamaica as the definite type locality. We cannot say whether *Lepidotis convoluta* Beauv. is distinct or not, but Swartz's type at least is Jamaican.

JAMAICA: Salt Hill (a mile off the Content road from Gordontown to Cinchona), growing in deep *Sphagnum*, 1903, *Underwood* 157.

The above collection represents, so far as known, the only one made in Jamaica since the time of Swartz. The fine material collected indicates a species abundantly distinct from that common in the vicinity on dry banks.

32. ***Lycopodium tortum*** Sieber, sp. nov.

A robust much-branched terrestrial plant with long pendent strobiles. Stems erect or ascending, a meter or more high, the secondary branches spreading, triangular in outline, attaining 20 cm. broad by 15 cm. high, repeatedly branched, the terminals inclined irregularly downwards and bearing the sessile strobiles; leaves on the older axes 5 mm. long by 0.5 mm. wide (on younger axes as short as 3 mm.) curved upwards and outward, becoming less curved and more widely spreading on the older axes, the curve commencing at about the middle, and the leaf tapering from above the middle to form an acute apex; margins entire; strobiles 1.5–2 cm. long, 3–4 mm. in diameter, cylindric or slightly angulate at the apex; sporophylls appressed, widely spreading, and but little curved when dry, 2.5 mm. long by 1 mm. wide, the margins irregular, with small scattered uneven teeth.

RANGE: Higher (volcanic) summits of the Lesser Antilles; specimens have been examined as follows:

ST. KITTS: Mt. Misery, *Britton & Cowell* 550.

GUADELOUPE: Mt. Perrin (*herb. Torrey*); 1898 (*herb. Jenman*).

DOMINICA: In old crater near Boiling Lake, Laudat, *Lloyd* 315.

MARTINIQUE: 1897 (*herb. Jenman*); *Sieber, Fl. Mixta* 328 (*herb. Kew*).

ST. VINCENT: *H. H. & G. W. Smith* 52.

This species was long ago issued by Sieber under the above name, which in deference to him we have here taken up for the coarse plant of striking habit concerning whose distribution we have now quite definite information. In St. Kitts the species is locally known as "Stag Horn." This plant has been confused with *L. curvatum* Sw., the type locality of which (Jamaica) is quite outside the range of the peculiar species of the volcanic islands.

A second species allied to the last was collected in 1902 by Percy Wilson in the Luquillo Mountains, Porto Rico (*no. 101*), but the specimens are unfortunately in the vegetative condition

only; it differs from this species in its much smaller size and in its strongly incurved leaves which are hairy on the lower surface near the base and often toothed. Mature strobiles are a desideratum.

33. *LYCOPODIUM PENDULINUM* Hook Ic. Pl. 1: pl. 90. 1837.*
(Type from Casapi, Peru, *Mathews* 1776.)

RANGE: [Peru]; Cargadira, Bolivia, 8000 ft., *Williams* 1386. Mr. Williams' specimens show a unique plant, widely distinct in habit from any others of the group.

CLAVATUM GROUP

It is a difficult problem to distinguish many of the species of this group, a large proportion of which Baker reduces to the single species *L. clavatum*, whose distribution is curiously given as "Arctic and alpine zones of both hemispheres, also mountains of tropical Asia, Africa and America, Cape, Mascaren [*sic*] Isles and Polynesia." In Jamaica a form occurs from 5000 ft. upwards to the very summit of the Blue Mountains which at present we are not able to separate on structural grounds from our common northern species,† although it differs *toto coelo* in habit. In place of our unobtrusive close-creeping plant, the Jamaican form is rampant in great masses over the paths about the Cinchona plantation, forming a weed, and sprawling over low shrubs in the greatest profusion. Material from the whole world will be needed to elucidate the relations of the species involved in this polymorphic tangle. Besides abundant material from Jamaica we have imperfect collections from Mexico, Guatemala, Colombia, Guiana, Brazil, Ecuador and Bolivia, but insufficient for monographic purposes. For these reasons we prefer to leave the Jamaican plants for the present under

34. *LYCOPODIUM CLAVATUM* L. Sp. Pl. 1101. 1753. (Type from Europe).

RANGE: Europe and North America from the Arctic zone as far as Pennsylvania; also (provisionally) Jamaica above 5000 ft., and possibly Mexico and Guatemala.

* *L. Eichleri* Fée, Crypt. Vasc. Bres. pl. 106. f. 4, cited by Baker as a synonym, is apparently distinct if Fée's plate is to be relied on, and his plates are usually extremely reliable. Mr. Baker further cites this species incorrectly as *L. pendulum*.

† With a distribution scattered well over the Northeastern States extending as far west as Washington State and Southward to Pennsylvania, this species is far from being either "arctic or alpine" in America, although it does attain both these regions in this country as in Europe.

IULIFORME GROUP

35. *Lycopodium iuliforme* sp. nov.

A low plant with short close-creeping stems and rigid upright monostachyous branches. Creeping stems 6–10 cm. long or more, with numerous roots throughout; leaves in 10 or more ranks, those of the lower surface pale, narrow, and somewhat lax, 2–2.5 mm. long, triangular-subulate from a wider base, those of the lateral surfaces ascending, twisted, 3–5 mm. long, somewhat rigid, ending in a firm acuminate point; erect branches terminal, or becoming apparently lateral from the innovating branches of the prostrate stems, 9–12 cm. high, leafy throughout, the leaves mostly 8-ranked, rather rigid, slightly spreading, 4–5 mm. long, lanceolate-acuminate; strobiles 3–3.5 cm. long, slightly thicker than the stems; sporophylls 8-ranked, lanceolate above from a broad base, the rigid apices wide-spreading; sporangia reniform, 1.5 mm. wide, entirely concealed by the broad base of the sporophylls.

GUIANA: Summit of Roraima, 8,600 ft., *McConnell & Quelch* 572. (Type at the New York Botanical Garden.)

A unique species forming a series of its own, intermediate in a way between the *Inundatum* group and the *Carolinianum* group. It was reported upon by C. H. Wright (Trans. Linn. Soc. II. 6: 87. 1901) as *L. contiguum* Kl., with which it has only a remote alliance. *L. contiguum* has membranous-tipped leaves and sporophylls, the latter soft, lax, and wide spreading, and with conspicuously erose margins.

§ 3. DIPHASIUM

The members of the section *Diphasium*, which forms a physiological rather than a structural alliance, will group themselves somewhat naturally as follows:

Vertical stems simple; foliage shoots prostrate, creeping, the leaves of the two under rows larger and appearing lateral. **Carolinianum Group.**

Vertical stems much branched.

Terminal foliage shoots with 4 rows of dimorphous leaves; upper surface with one row of leaves. **Complanatum Group.**

Terminal foliage shoots with 5 (or 6) rows of leaves, the upper surface with three rows of reduced leaves. **Scariosum Group.**

CAROLINIANUM GROUP

The species of this group were referred by Baker to our familiar *L. carolinianum* of the Southern States, but will readily separate themselves into at least three species as follows:

Sporophylls serrulate; under leaves triangular, nearly as broad at base as long; sporangia round-renate. 36. *L. goyazense*.

Sporophylls entire.

Sporangia depressed-renate; under leaves ovate, acute. 37. *L. meridionale*.
Sporangia round-renate; under leaves lanceolate. *L. carolinianum*.

36. ***Lycopodium goyazense* sp. nov.**

A small creeping plant with stout erect branches bearing large strobiles. Creeping stems 6 cm. or more long, notably dorsiventral, producing occasional short branches; leaves strongly dimorphic, those of the two under rows appearing lateral, triangular, symmetric, 2 mm. wide at the base, not contracted, 2.5 mm. long, acute, entire, thick, somewhat imbricated; those of the three upper rows small, triangular, twice as long as broad or more, stiff, remote from each other and thus exposing the broad upper surface of the stem; erect branches (peduncles) 7–9 cm. long, 1.5 mm. thick, with triangular scale-like leaves which are 4 mm. long by 1.5 mm. wide at base and serrulate; strobiles 3–4 cm. long, stout; sporophylls larger than the lateral leaves, 2.5 mm. wide by 5 mm. long, ovate, acuminate, not contracted above the middle; margins serrulate throughout.

BRAZIL: Goyaz, *Glaziou 22644*; also less perfect specimens from Minas Geraes, *Claussen*.

37. ***Lycopodium meridionale* sp. nov.**

A small close-creeping, sparingly branched plant with solitary upright strobilary branches. Creeping stems up to 40 cm. or more long, 1–1.5 mm. thick, with occasional short (2–4 cm.) lateral branches; leaves strongly dimorphic, those of the two under rows appearing lateral, 5 mm. long by 2 mm. wide, ovate, acuminate, falcate, the midrib curved asymmetrically and parallel to the proximal leaf-margin; leaves of the upper four rows subulate, spreading, 3.5 mm. long by 1 mm. wide; upright branches (peduncles) 8–26 cm. long, oftener rising from the short prostrate branches, with whorls of subulate spreading scale-like leaves with parallel margins or slightly contracted below the middle, entire or slightly erose near the base; strobiles 2.5–8 cm. long; sporophylls 2 mm. wide by 4 mm. long, triangular, contracted at the middle and subulate above, spreading, the margins entire above, erose below the middle, those of the same level not contiguous.

RANGE: Probably widely distributed through the tropics of meridional America. Specimens have been examined as follows:

PORTO RICO: Dry savannahs, Luquillo Mountains, *Percy Wilson 94* (type) (two sheets); *Sintenis 1544*.

CUBA: *Wright 1819*.

DOMINICA: Laudat, high wet turf, Boiling Lake, *Lloyd* 316.

GUIANA: Wet ground, Essequibo, *Jenman* (two sheets).

BRAZIL: San Carlos and Rio Negro, *Spruce* 3039; Moritiba, *Blanchet* 3470.

(LYCOPODIUM CAROLINIANUM L., ranging from New Jersey to Texas, is not found outside of the Southern States, and is introduced in the above synopsis for comparison only.)

COMPLANATUM GROUP

The only member of this group in the West Indies we described from herbarium material before having seen the plant in the field. Like *L. clavatum* of another group, *L. Fawcettii* forms a weed in the paths of the Cinchona plantation and grows luxuriantly, ascending over bushes and low shrubbery in a sprawling fashion and is thus quite in contrast with its more modest congeners of the Northern States. The status of *L. thyoides* H.B.K. of South America still remains to be determined. Our single West Indian species is

38. LYCOPODIUM FAWCETTII Lloyd & Underw. Bull. Torrey Club 27: 167. 1900. (Type from Jamaica.)

This species is common in Jamaica from 5000 feet altitude to the extreme summit of the Blue Mountains. It has also been found in Hispaniola (*Wright, Parry & Brummel* 37; *Picarda* 767; *Eggers* 2270).

SCARIOSUM GROUP

The members of this group are mostly from tropical or south temperate regions. *Lycopodium scariosum*, with which Baker has confused the American species, is from New Zealand, and there are other Old World species. The American species are mostly South American, only a single species reaching Jamaica in the West Indies. The American species may be separated as follows:

Lateral leaves of the dorsiventral branches directed upwards, straight, rigid, tapering from the base, not sharply pointed nor crowded. 39. *L. Gayanum*.

Lateral leaves of the dorsiventral branches curved downwards.

Leaves ascending, cuspidate, strongly revolute.

42. *L. Holtoni*.

Leaves spreading, slightly curved.

Lateral leaves broad near the apex, obtuse.

40. *L. lindsaeaceum*.

Lateral leaves broadest at the decurrent base.

41. *L. Jussiaei*.

39. LYCOPODIUM GAYANUM Remy* ; Gay, Hist. Chile Bot. 6: 545. 1853. (Type from Chile, Gay.)

A single specimen in the Meissner (Columbia) herbarium from Valdivia, Chile, no. 208 of "Bridges or Cuming?" represents this species in our collections as described, and shows characters warranting us in maintaining it.

40. LYCOPODIUM LINDSAEACEUM Spring, Flora 21: 180. 1838. (Type from Peru.)

This species was united by Baker with the New Zealand *L. scariosum*, which naturally has little to do with the new world representatives of the group. The species is represented in the herbarium of the New York Botanical Garden by a single specimen collected by Rusby in Bolivia, and by several more recently brought from the same country by Williams.

41. LYCOPODIUM JUSSIAEI Desv. Encyc. Bot. Suppl. 3: 543. 1813. (Type from Peru.)

We have specimens of this species collected by Spruce and Sodiro in Ecuador and were inclined for a time to separate Jamaica specimens collected by Purdie and by Jenman and more recently by Underwood and by Maxon. Jamaica material shows a marked differentiation in texture, the leaves being thinner, more distant, acute rather than mucronate, and inequilateral, *i. e.*, with the midrib nearer the anterior leaf-margin. In Jamaica the species is rare, growing at altitudes above 5000 feet. Baker (*loc. cit.*) reduced the species to a variety of *L. scariosum* of the Old World.

42. **Lycopodium Holtoni** sp. nov.

Main stems creeping, sending up lateral shoots 25 cm. or more tall, with foliage shoots ending in bifid peduncles; lateral (upper) leaves of the dorsiventral ascending branches crowded and imbricate, ascending, the lateral free margin revolute (so that the leaf appears strongly twisted in the dry condition), the upper surface arched, thick, coriaceous, cuspidate; ascending shoots 3–8 mm. wide, varying in diameter throughout the length; leaves of the under three rows 4–5 mm. long, 1.5 mm. wide at the base, awl-shaped, thin, scarious-margined and often slightly lacerate, the apices scarious or hair-like; strobiles 5–6 cm. long, 5 mm.

* This species is usually referred to Remy and it is not likely that Gay would name a species after himself, but we have failed to find in this volume any evidence that Remy described this species.

thick, appearing ridged by the somewhat carinate sporophyls; sporophyls ovate, acuminate with a scarious lacerate tip and a narrow (1 mm.) claw, 5 mm. long, by 2.5 mm. wide, the margin slightly erose; sporangia depressed-triangular, 3 mm. broad by 1.75 mm. deep, folded and irregular, sessile.

COLOMBIA: In montibus juxta Bogotam, 7 Oct. 1852, *I. F. Holton* 79.*

Unless otherwise noted all the above citations of specimens are from the combined herbaria of Columbia University and the New York Botanical Garden, now forming a single collection.

COLUMBIA UNIVERSITY.

*The extensive collection of Isaac F. Holton was one of the first made in Colombia and has never been studied; a full set of the collections is in the Torrey herbarium; Holton went out from Middlebury College on a twenty months' trip through Colombia. He afterwards published an account of his travels which bears the following title: *New Granada: twenty months in the Andes*. New York, 1857. A copy has recently been added to the library of the New York Botanical Garden.